

REMARKS

Favorable reconsideration of this application is respectfully requested in light of the following remarks, wherein claims 1 and 8 are amended. Claims 1-10 are currently pending in the present application.

As an initial matter, Applicant expresses gratitude to Examiner Peche for the courtesies granted Applicant's attorney during the recent interview. During the interview, the Examiner agreed that the art relied on in the rejection fails to disclose a work area provided with no identifier whose location is accurately known, and that this distinction overcomes the art of record. Consistent with that agreement, Applicant amends claims 1 and 8 to recite that "the second work area is provided with no identifier whose location is accurately known." As agreed to by the Examiner, this limitation clarifies that the second work area is provided with no identifier whose location is accurately known, and this limitation distinguishes over the art of record.

REJECTIONS UNDER 35 U.S.C. § 103(a)

Claims 1-10 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over International Publication No. WO 01/69041 A1 to Hakkinen (hereinafter "*Hakkinen*") in view of the published article "Mobile robots evolving in industrial applications" to Lehtinen et al. (hereinafter "*Lehtinen*").

Applicants traverse the rejection. Whether a claim is obvious is based on an objective analysis of the scope and content of the prior art, the differences between the prior art and each element of the claimed invention, and the level of skill in the pertinent art. *See Graham v. John Deere Co.*, 383 U.S. 1, 15-17 (1966). The Office's objective analysis of obviousness should be made explicit. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. ___, 82 U.S.P.Q.2d

1385, 1396 (2007); *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”). The Office fails to determine all the differences between the prior art and each element of the claimed invention, and fails to articulate reasoning to support a legal conclusion of obviousness.

Claims 1 and 8 are amended to recite that “the second work area is provided with no identifier whose location is accurately known,” which both *Hakkinen* and *Lehtinen* fail to disclose. The Examiner agreed during the interview that these factors do not appear to be disclosed in the combined references. For the reasons discussed during the interview and provided below, none of the art of record discloses the patentable features of new independent claims 1 and 8.

The Office states that *Hakkinen* discloses: “Driving mining vehicles (3, 4 and 5) on a service gallery (2) and a plurality of mine galleries (1) (first and second work areas) where the service gallery (2) is only provided with an identifier (16b) painted on the wall (accurately known location).” *See, e.g.*, the Office Action p. 3, paragraph 4. Even if it were true that only the service gallery contains identifiers of the type described by reference number 16b, this does not teach that a second work area has no identifier. To the contrary, *Hakkinen* discloses paint mark sequences (16a, 16b) in service galleries (2) as well as in production mine galleries (1). *See, e.g.*, Figure 6 and p. 1, ll. 3-6.

The aim in *Hakkinen* is to provide production mine galleries (1) with position markings painted on the walls so that a mine vehicle can be driven by an operator in a remote controlled manner so that light beams or other sighting means hit the positioning markings. *See, e.g.*, p. 4, ll. 28-33 and p. 5, ll. 5-14. Positioning markings (6a, 6b and 6c) in the

production mine gallery (1) are also clearly shown in Figures 2 and 3. Thereby in *Häkkinen* both work areas (production mine galleries 1 and service galleries 2) are provided with painted markings. Thus, *Häkkinen* fails to disclose any work area, which is provided with no identifiers whose location is accurately known.

Lehtinen also fails to disclose any work area, which is provided with no identifiers whose location is accurately known. *Lehtinen* teaches that the position is updated after traveling a certain distance or after traveling a certain time. *See, e.g.*, p.98. *Lehtinen* requires the position estimate be updated time to time as clearly shown in Figure 4. Further, on the left column, at the beginning of the third paragraph it is mentioned that a system regularly tells exact absolute pose after travelling a certain distance. Further in the same paragraph it is mentioned: "The vehicle could continue for a while with the aid of the positioning system installed on the vehicle but using the given absolute pose for correcting the drift." On page 99, left column, under heading "Mining" it is mentioned that the features of the tunnel walls of the route can be used for updating. When the update is based on topography of the walls, the shape of the walls has to be measured and updated continuously when driving on the predetermined route.

Lehtinen teaches to update the position at all places in the mine, which is something the present invention seeks to avoid. In *Lehtinen*, identifiers for the update have to be arranged for the whole travelling route, whereas in the present invention only the first work area need to be provided with identifiers. In the present invention the second work area does not include any identifiers since it may be, for example, a production tunnel wherein the conditions are so hard that identifier cannot be placed therein.

On page 4, last 4 lines of the Office Action the Examiner mentions "...it would have been obvious to one of ordinary skill in the art at the time of the invention was made to

implement this technique in a plurality of mining areas to determine the location and update the position of a mining vehicle." This statement appears to indicate that updating of *Lehtinen* is done at all mining areas, which is opposite to the present invention. Therefore, for at least the above reasons *Hakkinen* and *Lehtinen* at least fail to teach "the second work area is provided with no identifier whose location is accurately known," and thus the rejection should be withdrawn.

Claims 1 and 8 further recite "determining, when operating in the second work area, the location of the mining vehicle only on the basis of the dead reckoning." The Examiner alleges that it is obvious from *Lehtinen*'s dead reckoning system in combination with identifiers allegedly described in *Lehtinen* that in a second work area the location of the mining vehicle is determined only on the basis of the dead reckoning. However, *Lehtinen* fails to describe more than one work area, and explicitly discloses that the position estimation is updated continuously. *See, e.g.*, left column of p. 98. At most, *Lehtinen* might teach spreading the identifiers further apart within one work area, but does not describe a distinct work area in which the only basis of location determination is dead reckoning.

Furthermore, *Hakkinen* teaches away from a combination with *Lehtinen*. The Examiner points to certain passages within *Hakkinen* for the teaching that the mining vehicles can contain an inertial measurement device. However, a prior art reference must be considered as a whole, including portions that lead away from the claimed invention. *W. L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983) and MPEP § 2141.02 VI. The proposed modification cannot render the prior art unsatisfactory for its intended purpose. *In re Gordon*, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984) and MPEP § 2143.01 V. *Hakkinen* may disclose that inertial navigation devices have been utilized in mining vehicles previously. However, the intended purpose of *Hakkinen* is to

eliminate such inertial navigation on mining vehicles, because of its high price. *See, e.g.*, p. 2, ll. 21-26. *Hakkinen* discloses that the measuring vehicle marks the mining galleries so that the mining vehicles are controlling teleoperated via the control marks created by the measuring vehicle. *See, e.g.*, p. 2, l. 30 – p. 3, l. 10. Therefore, when considering *Hakkinen* as a whole for all that it teaches, one of ordinary skill in the art would be motivated to eliminate the inertial navigation devices and to rely solely on marking within the mine.

Lehtinen does not outweigh the teaching away from the invention in *Hakkinen*. Instead, *Lehtinen* also explains the pitfalls of dead reckoning systems, and leads one of ordinary skill in the art to desire beacons, transponders and landmarks over dead reckoning systems. Therefore, when *Hakkinen* and *Lehtinen* are considered as a whole, it is clear one of ordinary skill in the art would be motivated to either eliminate dead reckoning altogether, or at least use dead reckoning only in combination with a continuous marking system, and away from Applicants claimed system that relies on dead reckoning alone in distinct work areas.

The Examiner has also relied on the teachings of the measuring vehicle in *Hakkinen* for the teaching of an inertial navigation system. However, the measuring vehicle is not a mining production vehicle. The measuring vehicle is a teleoperated measuring vehicle used for surveying a mine gallery. *See, e.g.*, p. 3, ll. 3-4. The measuring vehicle comprises a video camera whose pictures are transmitted to a control room, so that an operator can drive under remote control the measuring vehicle on the basis of the video pictures. *See, e.g.*, p. 5, ll. 30-32. The only purpose of the measuring vehicle in *Häkinen* is to make needed measurements and paint positioning markings for the production mine vehicles. It would be illogical to update the position of the measuring vehicle on the basis of the markings done by itself. Therefore, for at least the above reasons *Hakkinen* and *Lehtinen* fail to teach

“determining, when operating in the second work area, the location of the mining vehicle only on the basis of the dead reckoning,” and thus the rejection should be withdrawn.

Dependent claims 2-7 and 9-10, which depend on claims 1 and 8, respectively, are also not obvious for at least the same reasons as for claims 1 and 8. For at least these reasons, no *prima facie* case of obviousness has been adduced, and the withdrawal of the rejection is respectfully requested.

CONCLUSION

For at least the foregoing reasons, it is submitted that the method and system of monitoring the location of a mining vehicle in a mine in claims 1 and 8, respectively, and the claims depending therefrom, are patentably distinguishable over the applied documents. Accordingly, withdrawal of the rejections of record and allowance of this application are earnestly solicited.

Should any questions arise in connection with this application, or should the Examiner believe a telephone conference would be helpful in resolving any remaining issues pertaining to this application, it is respectfully requested that the undersigned be contacted at the number indicated below.

EXCEPT for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§ 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account 50-0573. This paragraph is intended to be a CONSTRUCTIVE PETITION FOR EXTENSION OF TIME in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully Submitted,

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